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INDIAN SCHOOL MUSCAT  
MID-TERM EXAMINATION  
MATHEMATICS

Sub. Code: 041

Time Allotted: 3 Hrs

Max. Marks: 80

CLASS: X

13.09.2017

**General Instructions:**

- All questions are **compulsory**.
- The question paper consists of **30** questions divided into **four sections A, B, C and D**. **Section-A** comprises of **6** questions of **1 mark** each; **Section-B** comprises of **6** questions of **2 marks** each; **Section-C** comprises of **10** questions of **3 marks** each and **Section-D** comprises of **8** questions of **4 marks** each.
- There is no overall choice in this question paper.
- Use of calculator is not permitted.

**SECTION-A**

Question numbers 1 to 6 carry one mark each.

- Write a quadratic polynomial whose product of zeroes is  $-81$  and one of the zeroes is  $3$ .
- Write the values of  $k$  for which the quadratic equation  $x^2 - kx + 9 = 0$  has equal roots.
- Write the common difference of an A.P. whose  $n^{\text{th}}$  term is  $3n + 5$ .
- If  $\sin \theta = 1/3$ , then find the value of  $(2\cot^2 \theta + 2)$ .
- The perimeter of two similar triangles ABC and LMN are  $60\text{cm}$  and  $48\text{cm}$  respectively. If  $LM = 8\text{cm}$ , then what is the length of AB?
- Find the distance of the point  $(2, 3)$  from  $x$ -axis.

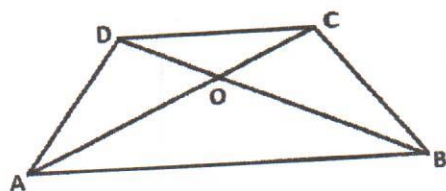
**SECTION-B**

Question numbers 7 to 12 carry two marks each.

- For what value of  $k$  the following system of linear equations has a no solution?  

$$x + 2y = 3$$

$$(k - 1)x + (k + 1)y = k + 2$$
- In the fig, if  $AB \parallel DC$ , find the value of  $x$ .  
 $DO = x - 2$ ,  $CO = x + 3$ ,  
 $AO = x + 5$  and  $BO = x - 1$ .

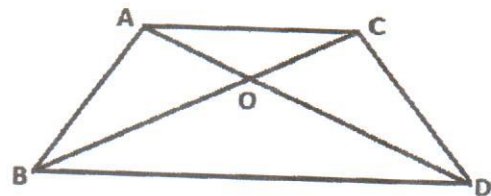


9. How many terms are there in the AP 2, 9, 16, ..., 261 ?
10. Find the value of  $\sec 45^\circ$  geometrically.
11. Express 32760 as product of its prime factors. Is it unique?
12. If  $m$  and  $n$  are the zeroes of the polynomial  $6x^2 - 7x + 2$ , find the quadratic polynomial whose zeroes are  $\frac{1}{m} + \frac{1}{n}$ .

### SECTION-C

Question numbers 13 to 22 carry three marks each.

13. Prove that  $\sqrt{5}$  is an irrational number.
14. Using Euclid's division algorithm find the HCF of 306 and 657. Also find their LCM using their HCF.
15. Solve for  $x$ :  $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$  ( $x \neq 0, b \neq 0, x \neq 0$ )
16. Solve graphically the pair of linear equations and shade the triangle formed by these two lines with  $x$ -axis.  
 $3x + 4y - 20 = 0$  ;  $x - 2y = 0$
17. Find the value(s) of  $p$  for which the points  $(3p + 1, p)$ ,  $(p + 2, p - 5)$  and  $(p + 1, -p)$  are collinear.
18. Find the ratio in which  $y$ -axis divides the line segment joining the points  $(5, -6)$  and  $(-1, -4)$ . Also find the point of intersection.
19. Find the value of the following :  
 $\frac{\cos 50^\circ}{2\sin 40^\circ} + \frac{4(\operatorname{cosec}^2 59^\circ - \tan^2 31^\circ)}{3\tan^2 45^\circ} - \frac{2}{3} \tan 12^\circ \tan 78^\circ \sin 90^\circ$
20. D and E are points on the sides CA and CB respectively of a triangle ABC right angled at C. Prove that  $AE^2 + BD^2 = AB^2 + DE^2$ .
21. In Fig. 6.44, ABC and DBC are two triangles on the same base BC. If AD intersects BC at O, show that  $\frac{\operatorname{ar}(ABC)}{\operatorname{ar}(DBC)} = \frac{AO}{DO}$ .



### SECTION-D

Question numbers 23 to 30 carry four marks each.

23. Solve graphically the pair of linear equations and write the coordinates of the vertices of the triangle formed by these two lines with  $x$  - axis.  
$$3x + y - 3 = 0 ; \quad 2x - y + 8 = 0$$
24. A lending library has a fixed charge for the first three days and an additional charge for each day thereafter. Siva paid ₹ 27 for a book kept for seven days, while Rekha paid ₹ 21 for the book she kept for five days. Find the fixed charge and the additional charge paid by them. What is the importance of a library?
25. In a class test, the sum of Swati's marks in Mathematics and English is 30. Had she got 2 marks more in Mathematics and 3 marks less in English, the product of their marks would have been 210. Find her marks in the two subjects.  
Which value would have Swati violated if she resorted to unfair means?
26. Find the sum of the first 40 positive integers divisible by 6.
27. Prove that the ratio of the areas of two similar triangles is equal to the squares of the ratios of their corresponding sides.
28. Evaluate: 
$$\frac{\operatorname{cosec}^2(90 - \theta) - \tan^2 \theta}{4(\cos^2 48^\circ + \cos^2 42^\circ)} - \frac{2 \tan^2 30^\circ \sec^2 52^\circ \sin^2 38^\circ}{\operatorname{cosec}^2 70^\circ - \tan^2 20^\circ}$$
29. Two poles of equal heights are standing opposite to each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the tops of the poles are  $60^\circ$  and  $30^\circ$ , respectively. Find the height of the poles and the distances of the point from the poles.
30. Find the ratio in which the line segment joining  $A(1, -5)$  and  $B(-4, 5)$  is divided by the  $x$ -axis. Also find the coordinates of the point of division.

End of the Question Paper